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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/270,039 03/16/99 HUANG

J AMAT/3434/PD

EXAMINER

MM91/0621

PATENT COUNSEL MS/2061
LEGAL AFFAIRS DEPT
APPLIED MATERIALS INC
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FOURSON III, G

ART UNIT

PAPER NUMBER

2823

DATE MAILED:

06/21/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary

Application No.

09/270,039

Applicant(s)

HUANG, JUDY H

Examiner

George Fourson

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-29 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 6-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) g.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

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1. Applicant's election with traverse of the invention of group II in Paper No. 9 is acknowledged. The traversal is on the ground(s) that the materially different process produces the products of claims 2 and 4. This is not found persuasive because claim 1 is open to producing a product that can be made by materially different processes than those of claim 26 such as processes which do not comprise the additional dielectric layer depositing steps of claim 26.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 14-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 17, the recitation of forming a photoresist layer on the second dielectric layer causes confusion as what layers are required to be formed in the claims. It appears that only one photoresist layer is intended in claim 17 which implies that the photoresist layer formed in claim 14 is optional. If the photoresist layer in claim 17 is the same as that of claim 14 then "the" should precede the use of the term. The claims should be amended to provide clear antecedent basis for all terms employed and to positively recite the intended steps. In claim 29, line 1, it appears that "the" should precede "substrate".

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 14-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Endo et al 4532150, European Patent 0725440, Wang et al 4872947 and applicant's admitted prior art.

Endo discloses formation of SiC by plasma deposition at 50-500°C on silicon using methylsilane as source gas and helium carrier gas at 0.05-10 Torr exemplifying use of 100 W Rf power to create the plasma. The reference does not disclose depositing a layer over the SiC layer or the dielectric constant of the SiC layer produced.

Europe '440 discloses plasma deposition of a SiC barrier layer using methylsilane as source gas at 0.1-5 W/cm² at 50-600°C on a dielectric layer followed by formation of a metal layer on the SiC layer. The reference also discloses that the layers 5 and 9 can be SiC (col.4). The choice of particular conditions to form the SiC layer would have been a matter of routine optimization within the teachings of the references. The SiC layer so produced would have the recited dielectric constant and reflectivity because the same materials would be treated in the same manner as in the instant invention. The choice of particular thicknesses of layers used would have depend on the desired device dimensions and device characteristics on the finished wafer and therefore would have been a matter of routine optimization.

Applicant admits the formation of SiC as an antireflective layer to have been known prior to applicant's invention. Applicant also appears to admit the arrangement of layers recited including formation of a photoresist on a SiC ARC over a series of layers to be etched including etch stop and barrier layers including a low dielectric constant dielectric layer/barrier layer combination on the substrate. There is some confusion in this regard in view of the rejection under 35 USC 112, paragraph 2 above. In the alternative, the examiner takes official notice that the arrangement of layers recited was known at the time of applicant's invention.

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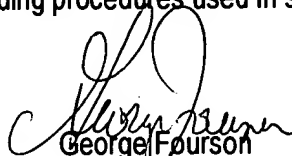
Wang et al discloses in-situ deposition of interlevel dielectrics for multilevel metallization (col.1).

In view of the disclosure of Europe '440 and Endo et al that SiC is suitable as a barrier layer and has a dielectric constant less than 5 as well as being suitable as an interlayer dielectric layer, it would have been within the scope of one of ordinary skill in the art to employ the SiC of Endo et al or Europe '440 as the dielectric and barrier layers in the admitted or known structure and to form the layers in-situ in view of the disclosure of Wang that such layers can be formed in-situ.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. See MPEP 203.08.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner George Fourson whose telephone number is (703) 308-2544. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax number for this group is (703)308-7722(7724,3431 and 3432). MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.


George Fourson
Primary Examiner
Art Unit 2823

GFourson
June 17, 2001